

Technical Analysis of the “Trim Line”

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Outline

- What is the “trim line”?
- What is model uncertainty? Is the “trim line” a function of model uncertainty?
- How has the trim line been used for the Blue Lakes Trout Farm (Blue Lakes Spring) and Snake River Farms (Clear Springs) delivery call? Is it technically justified?
- If we are going to use a “trim line”- what should it try to accomplish?

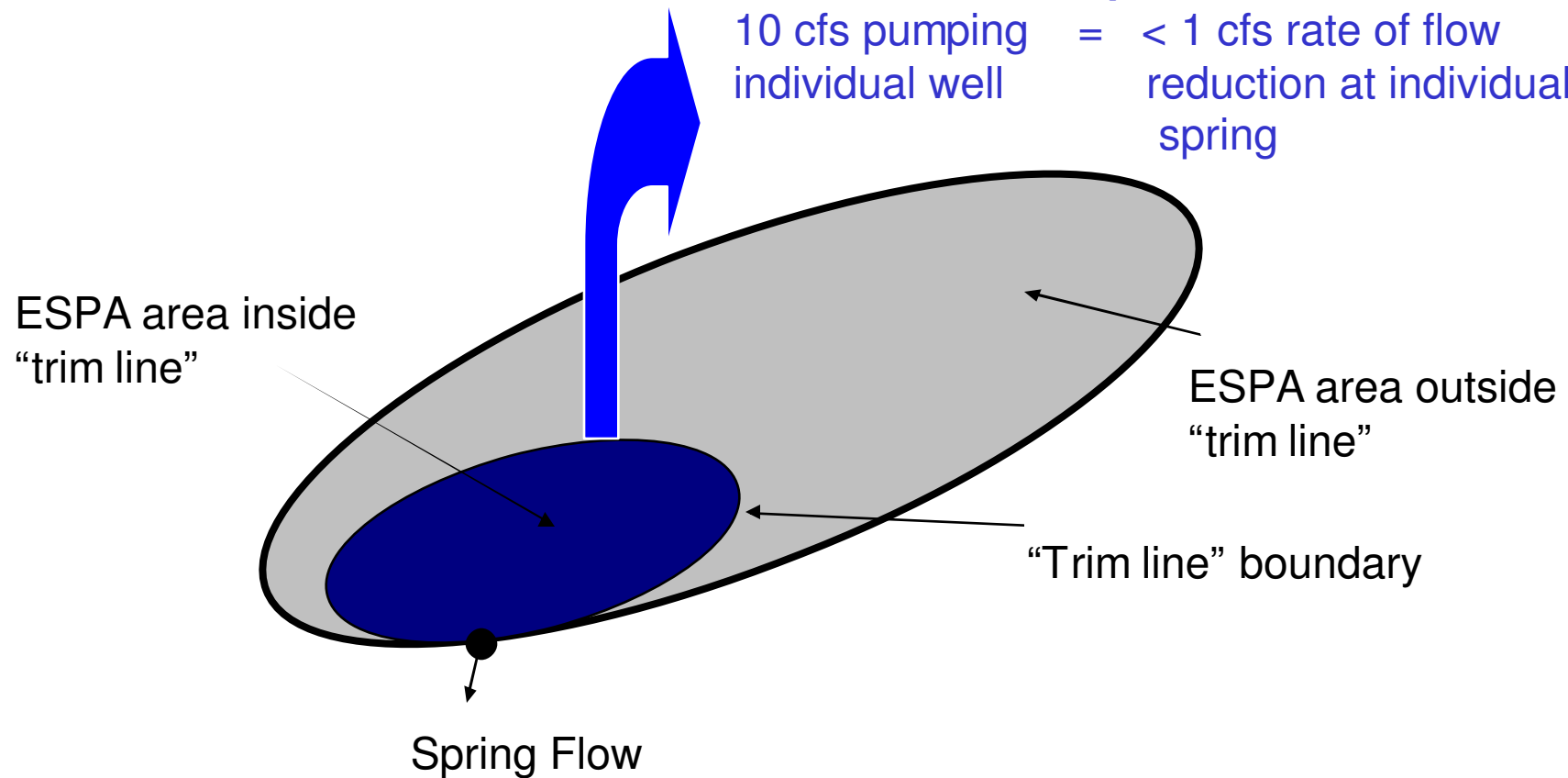
What is the “Trim Line”?

- Area of ESPA where ground water pumping will deplete flow at individual spring by less than 10 percent of total consumptive use. Determined by ESPAM.
 - Example: Ground water pumping (consumptive use) of 10 cfs outside the trim line would deplete flow at the individual spring by less than 1 cfs.
- “Trim line” also includes a clip to the WD 130 boundary.

What is the “Trim Line”?

“Trim Line” Example

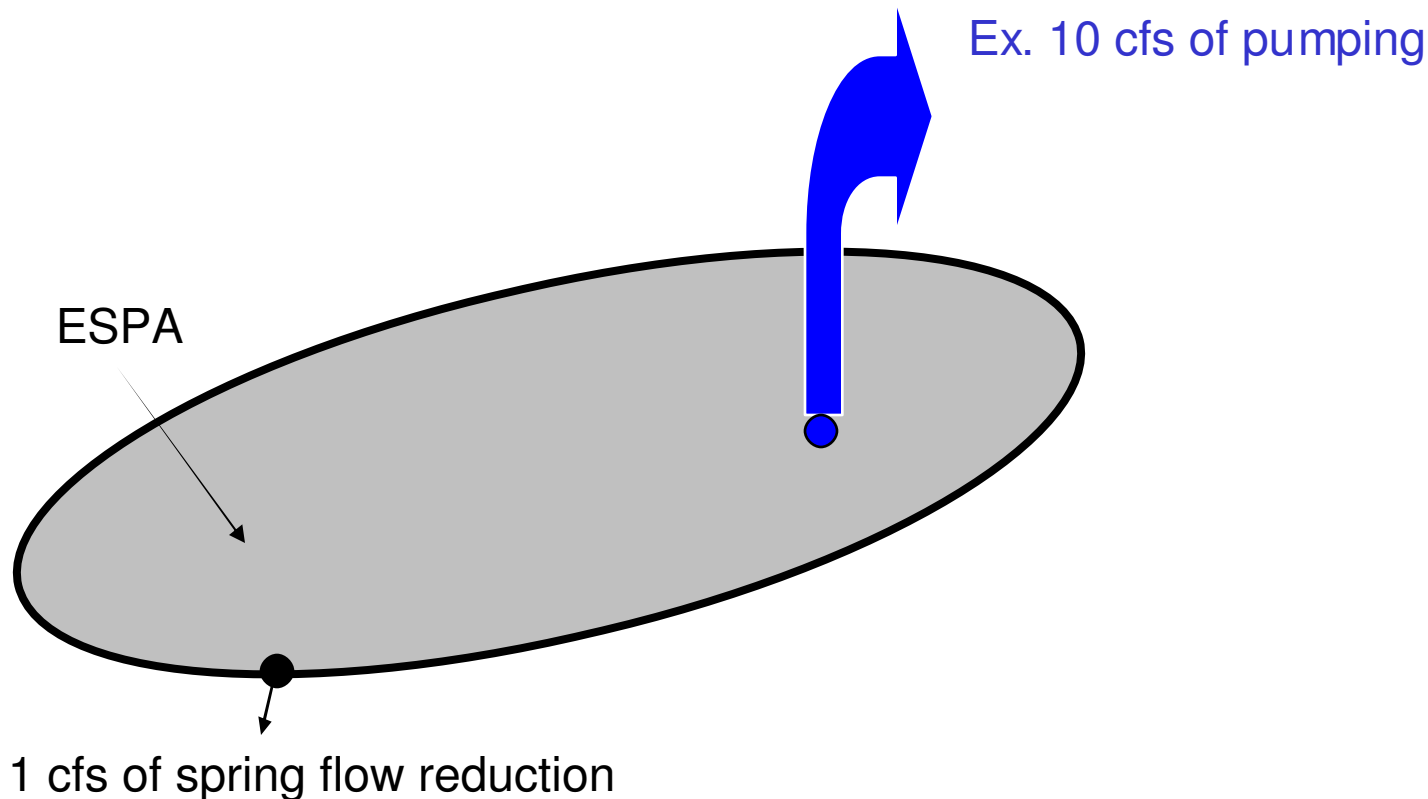
10 cfs pumping individual well = < 1 cfs rate of flow reduction at individual spring



Incorrect Assumption that 10% Uncertainty in Calibration Targets Justifies “Trim Line”

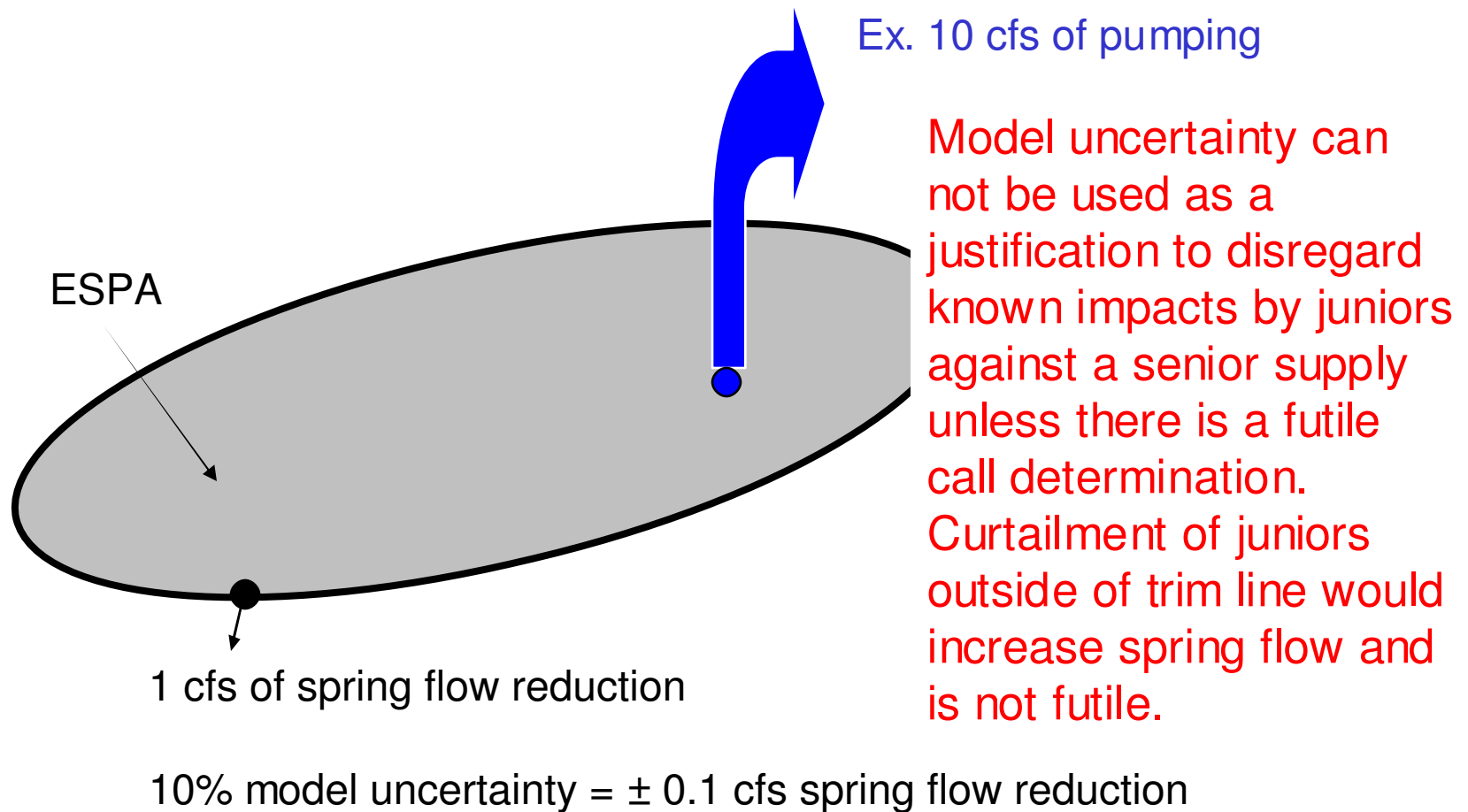
- Uncertainty in model calibration targets:
 - Ground water levels ($\pm 1-10$ ft, $<1\%$ accuracy, *hundreds of targets*)
 - Spring flow (varies, ± 2 to 5% as high as 10% depending on measuring device- weir, flow meter in canal, *targets*)
 - River reach gains (varies, ± 5 to 10 percent or greater, *targets*)
- There is no reasonable justification to assume that the model calibration target accuracy is limited to river gage accuracy or that it is 10 percent.

What is a technically justified method to calculate the effects of 10% model uncertainty on the impacts of an individual well pumping on a spring?

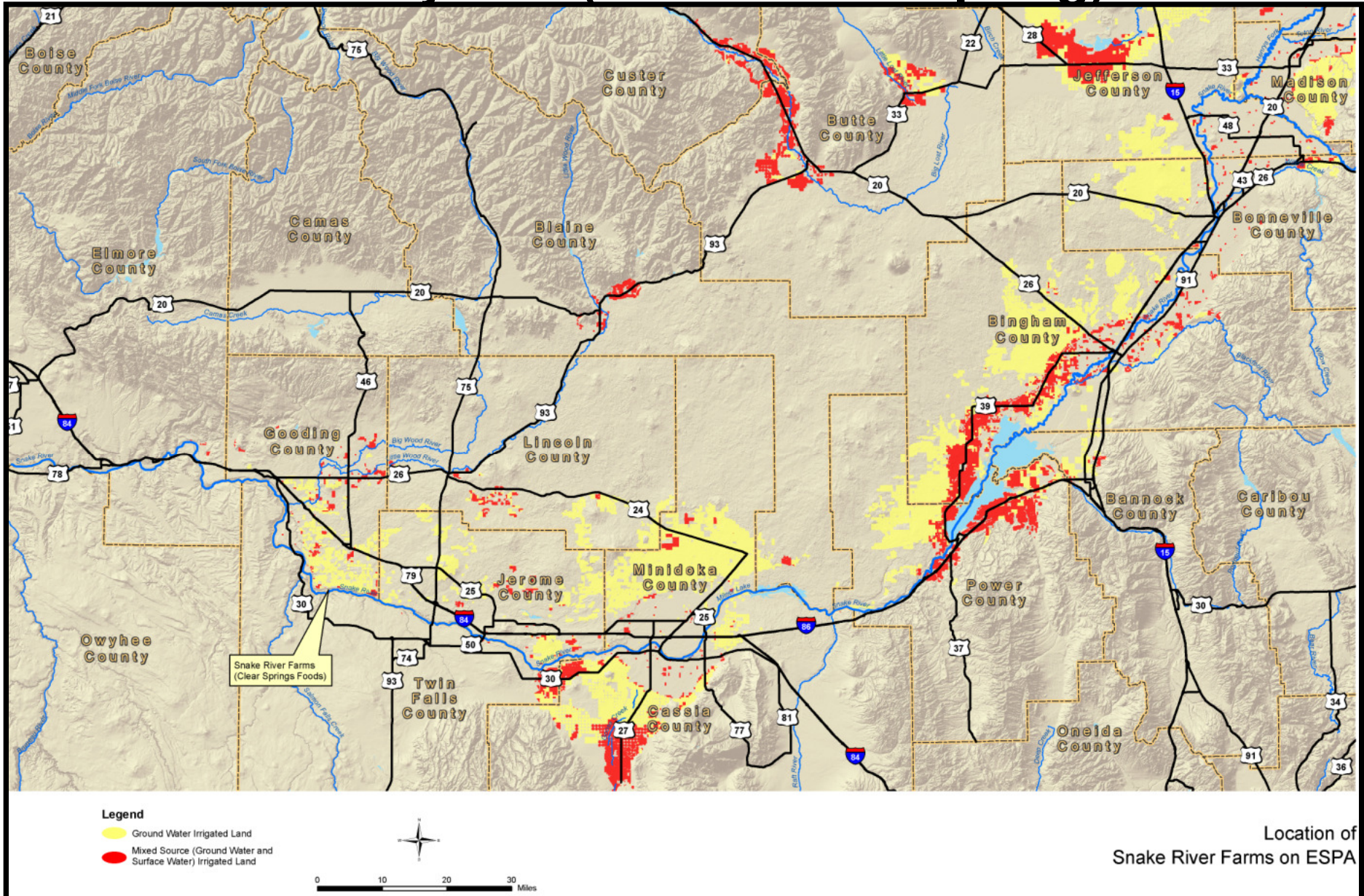


10% model uncertainty = $\pm 10\%$ at spring flow or 0.1 cfs spring flow reduction

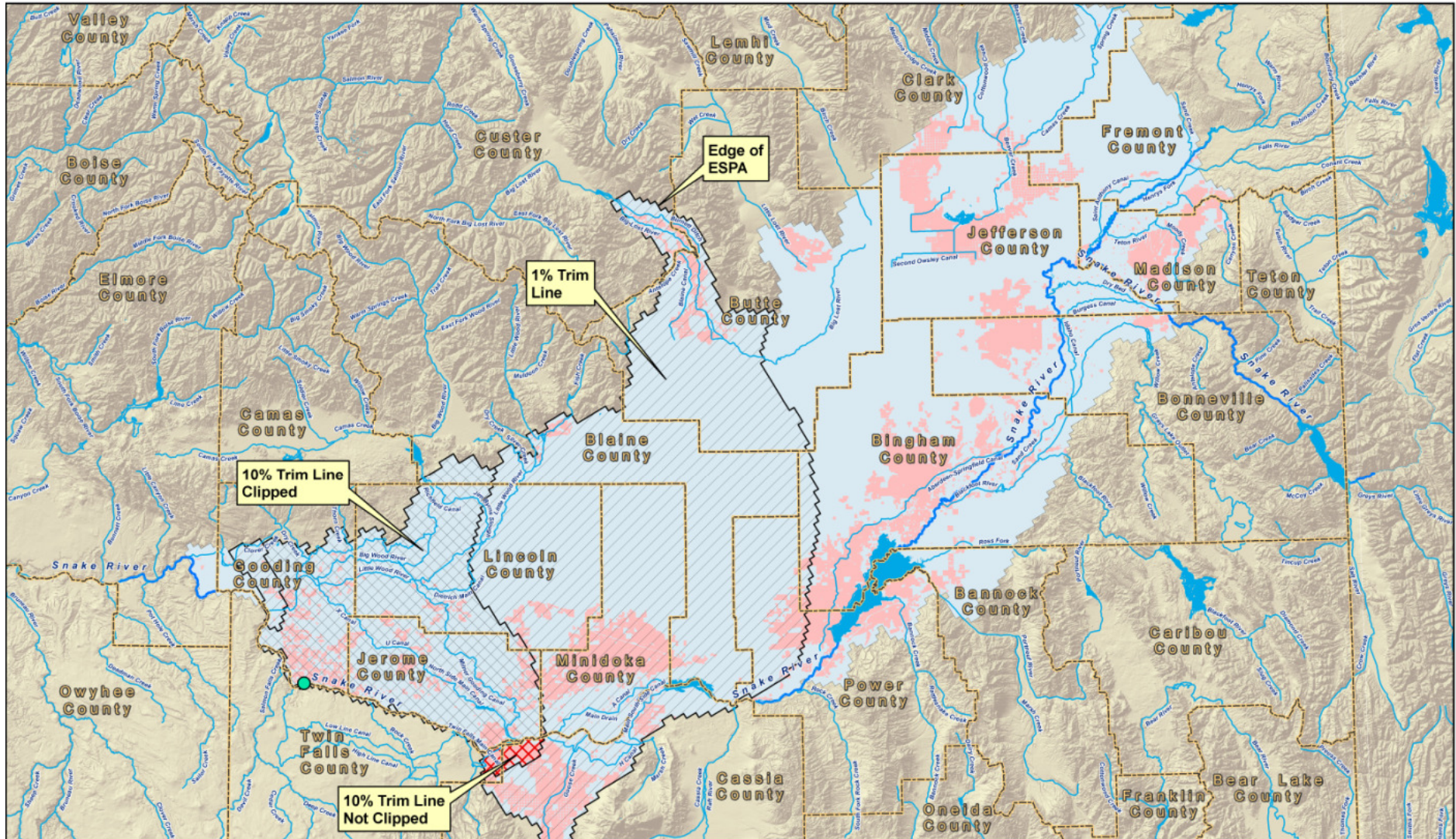
What is a technically justified method to calculate the effects of 10% model uncertainty on the impacts of an individual well pumping on a spring?



Use of “Trim Line” for Snake River Farms Delivery Call (Clear Lakes Spring)

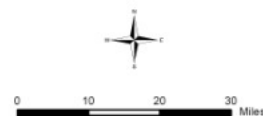


Use of “Trim Line” for Snake River Farms Delivery Call (Clear Lakes Spring)



Legend

- Clear Springs Farms, Surface Water Diversion Point
- Ground Water Pumping Areas
- No Trim Line (All of ESPA)
- 10% Trim Line Clipped to WD 130 (More than 10% Depletion by Individual Wells on Buhl to 1000 Springs Reach)
- 10% Trim Line Not Clipped to WD 130 (More than 10% Depletion by Individual Wells on Buhl to 1000 Springs Reach)
- 1% Trim Line (More than 1% Depletion by Individual Wells on Buhl to 1000 Springs Reach)



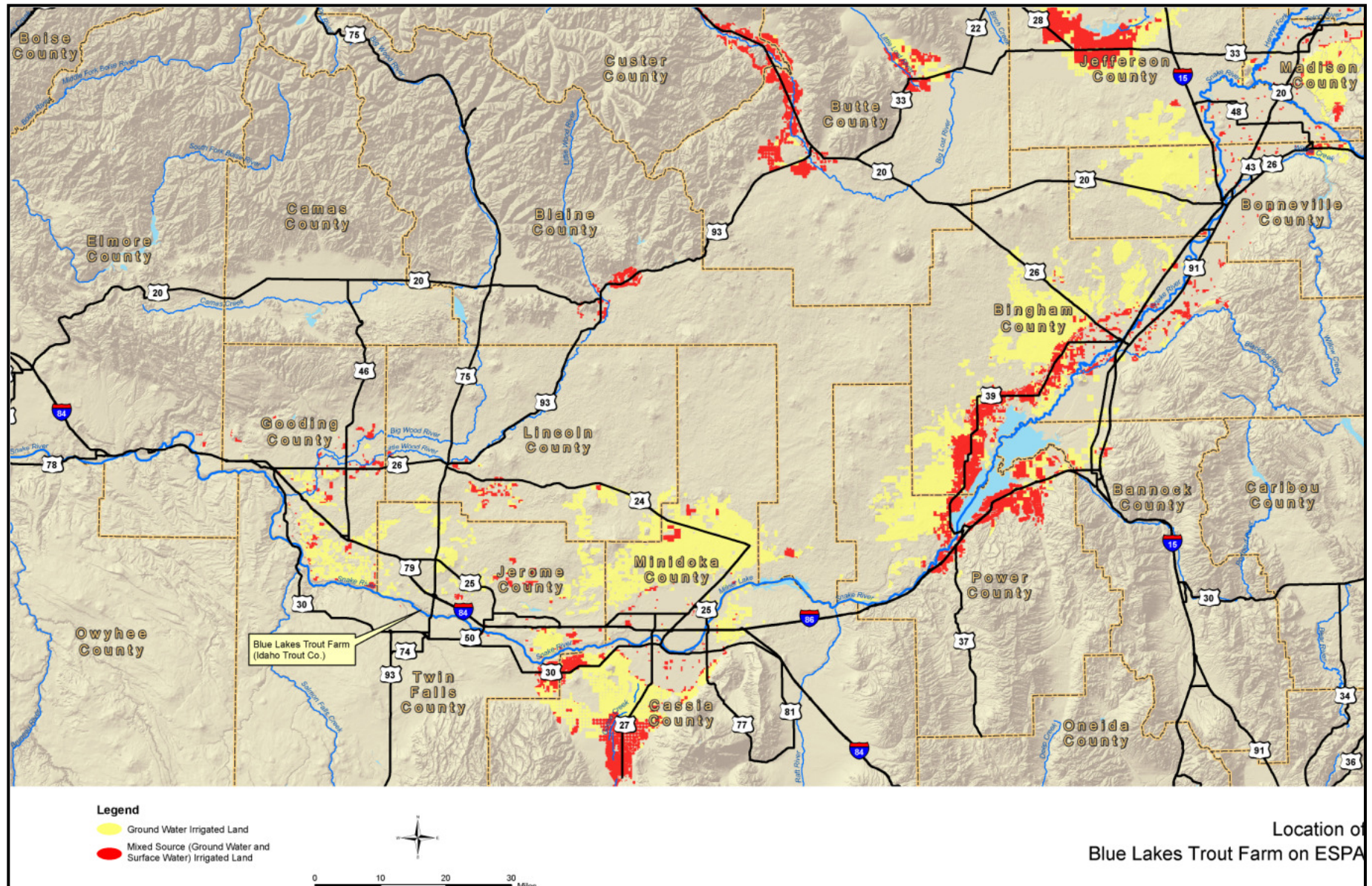
Use of “Trim Line” for Snake River Farms Delivery Call (Clear Lakes Spring)

	Curtailed Groundwater Irrigated Area (acres)	# of Model Cells	Curtailed Groundwater Consumptive Use (ac-ft)
September 15, 1955 Priority			
Full Curtailment of Junior Rights	717,428	4,070	1,434,570
1% trim line	288,577	1,797	632,033
10% trim line, <i>not</i> clipped to WD130	85,059	649	202,375
10% trim line, clipped to WD130	75,509	614	181,328
February 4, 1964 Priority			
Full Curtailment of Junior Rights	506,265	3,815	1,008,541
1% trim line	193,508	1,702	423,404
10% trim line, <i>not</i> clipped to WD130	56,852	611	136,066
10% trim line, clipped to WD130	51,071	594	123,326

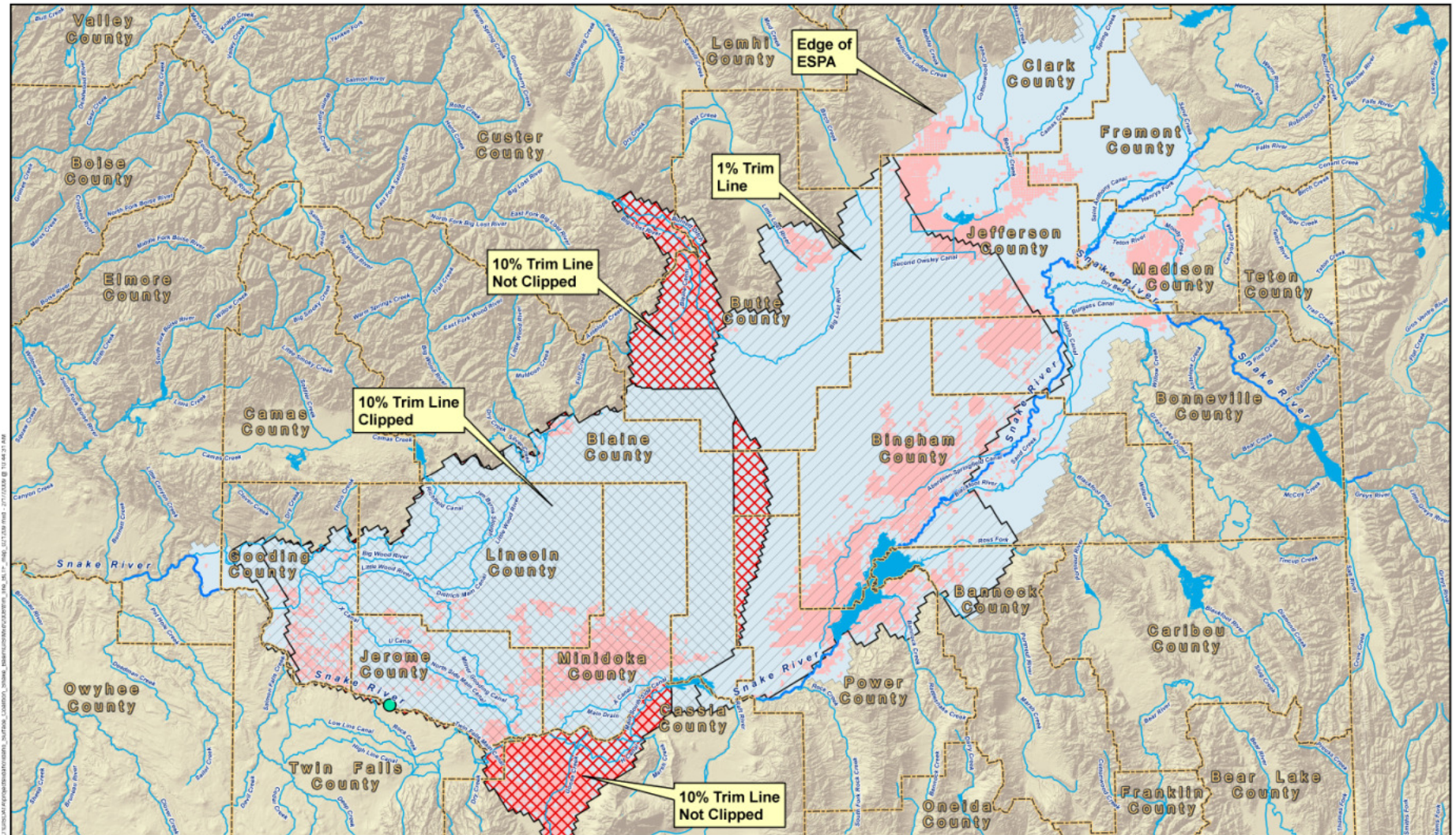
Use of “Trim Line” for Snake River Farms Delivery Call (Clear Lakes Spring)

September 15, 1955 Priority			
Scenario	Modeled Buhl to Thousand Springs Reach Gain (cfs)	Assuming 6.9% of Flow in Buhl to Thousand Springs Reach as in Order (cfs)	Modeled Clear Lakes Spring Drain Flow (cfs)
Full curtailment	98.22	6.78	22.90
1%trim line	94.08	6.49	21.90
10%trim line <i>not</i> clipped to WD130	56.32	3.89	12.79
10%trim line clipped to WD130	53.27	3.68	12.05

Use of “Trim Line” for Blue Lakes Trout Farm Delivery Call (Blue Lakes Spring)

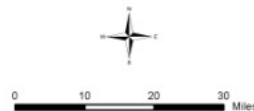


Use of “Trim Line” for Blue Lakes Trout Farm Delivery Call (Blue Lakes Spring)



Legend

- Blue Lakes Trout Farm Surface Water Diversion Point
- Ground Water Pumping Areas
- No Trim Line (All of ESPA)
- 10% Trim Line Clipped to WD 130 (More than 10% Depletion by Individual Wells on Devils Washbowl to Buhl Reach)
- 10% Trim Line Not Clipped to WD 130 (More than 10% Depletion by Individual Wells on Devils Washbowl to Buhl Reach)
- 1% Trim Line (More than 1% Depletion by Individual Wells on Devils Washbowl to Buhl Reach)



Use of “Trim Line” for Blue Lakes Trout Farm Delivery Call (Blue Lakes Spring)

	Curtailed GW Irrigated Area (acres)	# of Model Cells	Curtailed Groundwater Withdrawal (ac-ft)
<i>November 17, 1971 Priority</i>			
Full Curtailment of Junior Rights	361,600	3603	721,818
1% trim	260,955	2661	547,933
10% trim, with out clip to WD130	116,711	1473	261,562
10% trim, clipped to WD130	74,936	1068	173,241
<i>December 28, 1973 Priority</i>			
Full Curtailment of Junior Rights	290,655	3481	577,642
1% trim	207,148	2560	433,813
10% trim	88,878	1427	198,130
10% trim, clipped to WD130	58,364	1046	134,091

Use of “Trim Line” for Blue Lakes Trout Farm Delivery Call (Blue Lakes Spring)

Scenario	Devils Washbowl to Buhl Reach Gain (cfs)	Director's Order (20%)	Blue Lakes Springs
11/17/1971 priority, full curtailment	96.28	19.26	33.08
11/17/1971 priority, 1% trim line	95.46	19.09	32.76
11/17/1971 priority, 10% trim line clipped to WD1	62.96	12.59	19.77
Scenario	Devils Washbowl to Buhl Reach Gain (cfs)	Director's Order (20%)	Blue Lakes Springs
12/28/1973 priority, full curtailment	73.52	14.70	25.83
12/28/1973 priority, 1% trim line	72.84	14.57	25.56
12/28/1973 priority, 10% trim line clipped to WD1	48.58	9.72	15.87

Conclusions

- Many model calibration targets (gw levels, spring flow measurements) are more accurate than 10 percent.
- No reasonable justification to use model uncertainty as basis for “trim line”.
- No technical or admin. basis for WD 130 clip to “trim line”.
- If model uncertainty is to be considered- it should be done calculating the impacts of individual wells on individual springs- not using a trim line.
- The “trim line” disregards the impacts from many wells that cumulatively reduce up to $\frac{1}{2}$ of the senior’s spring flow.
- There is no evidence of a futile call for these individual impacts.
- Mitigation for these impacts would restore the senior’s supply and can be ordered at the same quantity of impacts.

Conclusions

- If a “trim line” is to be used, the basis for selection should be to identify those wells that impact the senior’s supply above a *de-minimus* impact.
- Selection of a “trim line” that reduces the senior’s supply by one-half obviously does not identify the wells causing more than a *de-minimus* impact.
- More work should be done to identify a “trim line” that focuses the mitigation requirements on the junior pumping causing an impact while at the same time restoring the senior’s supply. A 1% “trim line” is an option that meets this goal. More evaluation needed.
- There is an option to order mitigation by junior’s to the extent that they are causing impacts. There is no need for “full curtailment”. The current IDWR orders within the trim line do not require full curtailment and allow mitigation to the extent of impacts.